

[Name of the Document] Claims

[Claim 1]

A shell type needle roller bearing wherein a plurality of needle rollers are arranged along the inner-diameter surface of a shell type outer ring formed by pressing, characterized in that the surface roughness of the inner-diameter surface of said outer ring is finer than the surface roughness of its outer-diameter surface.

[Claim 2]

A shell type needle roller bearing as claimed in claim 1 wherein the circumferential surface roughness of the inner-diameter surface of said outer ring is Ra 0.05-0.3 μm .

[Claim 3]

A shell type needle roller bearing as claimed in claim 2 wherein the axial surface roughness of the inner-diameter surface of said outer ring is Ra 0.3 μm or less.

[Claim 4]

A shell type needle roller bearing wherein a plurality of needle rollers are arranged along the inner-diameter surface of a shell type outer ring formed by pressing, characterized in that the inner-diameter roundness of said outer ring is not more than 10 μm .

[Claim 5]

A shell type needle roller bearing wherein a plurality of needle rollers are arranged along the inner-diameter surface of a shell type outer ring formed by pressing, characterized in that the amount of uneven thickness of the tubular portion of said outer ring is less than 10 μm .

[Claim 6]

A shell type needle roller bearing as claimed in any of claims 1-5 wherein means for making the surface roughness of the inner-diameter

surface of said outer ring finer than the surface roughness of its outer-diameter surface, means for making the inner-diameter roundness of said outer ring less than 10 μm , or means for making the amount of uneven thickness of the tubular portion of said outer ring less than 10 μm is one in which an ironing step is provided in the pressing for forming said shell type outer ring, and the lubricating conditions on the outer-diameter side ironing surface which is the outer-diameter surface of said outer ring in the ironing step are a substantially fluid lubricating state.

[Claim 7]

A shell type needle roller bearing as claimed in claim 6 wherein the number of drawings in a drawing step in said pressing is not more than three times, and said drawing step is a drawing/ironing step carried out simultaneously with said drawing step, which is final.

[Claim 8]

A shell type needle roller bearing as claimed in claim 7 wherein the number of drawings in said drawing step is one, and said ironing step is a drawing/ironing step carried out simultaneously with this one-time drawing step.

[Claim 9]

A shell type needle roller bearing as claimed in any of claims 6-9 wherein the material of said shell type outer ring is a phosphate film-treated steel plate.

[Claim 10]

A support structure for a spindle of a compressor in which a compression action member of the compressor is actuated by rotary-driving the spindle, and radial loads on the spindle are supported by a needle roller bearing arranged in the compressor, characterized in that said needle roller bearing is a shell type needle roller bearing as claimed in any of claims 2-9.

[Claims 11]

A support structure for a piston pump driving portion wherein the driving portion of the piston pump is abutment-supported by a needle roller bearing fitted on an eccentric portion of a motor output shaft, characterized in that said needle roller bearing is a shell type needle roller bearing as claimed in any of claims 2-9.